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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/763,567	Applicant(s) GILMANSHIN ET AL.
	Examiner KARLHEINZ R. SKOWRONEK	Art Unit 1631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6,8-13,18-47 and 49-57* is/are pending in the application.

4a) Of the above claim(s) *13,19,20,22,37 and 47* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,8-12,18,21,23-36,38-46 and 49-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Status

Claims 1-4, 6, 8-13, 18-47, and 49-57 are pending.

Claims 5, 7, 14-17, and 48 are cancelled.

Claims 13, 19-20, 22, 37, and 47 are withdrawn as being directed to a non-elected invention.

Claims 1-4, 6, 8-12, 18, 21, 23-36, 38-46, and 49-57 have been examined.

Claims 1-4, 6, 8-12, 18, 21, 23-36, 38-46, and 49-57 are rejected.

Priority

This application claims priority to provisional application no. 60/442,175 filed on 23 January 2003.

Claim Objections

Response to Arguments

The objection to claim 31 as containing a typographical error has been withdrawn in view of the amendment of the claim.

Claim Rejections - 35 USC § 101

Response to Arguments

The rejection of 1-4, 6, 8-12, 18, 21, 23-46, and 50-57 as directed to non-statutory subject matter under 35 USC 101 has been withdrawn in view of the amendments to the claims.

Claim Rejections - 35 USC § 112

Response to Arguments

The rejection of claims 1, 29, 30, 32, and 55-57 as indefinite under 35 USC 112, second paragraph has been withdrawn in view of the amendments to the claims.

The rejection of claim 32 as indefinite under 35 USC 112, second paragraph has been withdrawn in view of the amendments to the claims.

The rejection of claim 56 as indefinite under 35 USC 112, second paragraph has been withdrawn in view of the amendments to the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4, 6, 8-12, 18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (PG PUB 2003/0082538), in view of Chan (WO 98/35012), in view of Chan et al. (US PG PUB 2002/0039737) and in view of Sun (Pattern Recognition Letters Vol. 16, p. 987-996, 1995).

The claims are directed to a method for analyzing polymer intensity data from a sample comprising obtaining intensity profiles from individual labeled polymers contained in the sample, aligning individual intensity profiles from individual labeled polymers with respect to an alignment reference point, combining aligned individual intensity profiles to generate a population profile, selecting a peak in the population profile and obtaining individual intensity profiles that contribute to peak, combining individual intensity profiles that contribute to the peak to generate a peak profile, and comparing the peak profile with the population profile storing the intensity profile as a intensity vs. length profile. Further embodiments are drawn to the type of polymer, fluorescence data, labeling techniques, and data manipulations.

Claim 56 is directed to a method for analyzing polymer intensity data with the limitations of claims 1 and 25, but does not require an alignment profile that is a center of molecule reference point as in claim 1.

Claim 55 is directed to a method for analyzing polymer intensity data with the limitations of claims 1 and 28, but does not require an alignment profile that is a center of molecule reference point as in claim 1.

Taylor et al. teach a method of analyzing polymer populations in which intensity profiles from individual polymers are obtained [0156]. Taylor et al. shows that individual polymers can be labeled by an incoming base or primer/probe [0232]. The profiles are aligned with respect to an alignment reference point and combined to generate a sample population profile (fig. 16) [0187]. Taylor shows selecting a peak in the sample profile and obtaining intensity profiles that contribute to the peak then combining the individual intensity profiles to generate a peak profile and comparing the peak profile with the sample profiles (fig 18 vs. fig16). Taylor show the peak profile consists of a subset of peaks from the sample profile (compare figure 16 to figure 18). Taylor shows storing intensity profiles as intensity vs. length profiles [0134 and 0156]. Taylor teaches that the sample can contain a heterogeneous mixture of polymers that are of different sizes/lengths [0134] and the mixtures of polymers have different sequences [0136]. Taylor teaches the sample is separated according to size prior the alignment [0134]. Taylor teaches that the intensity is fluorescence and profiles are fluorescence profiles [0156]. Taylor et al. teaches the polymers are embedded in a gel matrix [0232]. Taylor teaches a computer-implemented method (abstract, line 1-2). Taylor teaches the

polymer is the nucleic acid, DNA [0030]. Taylor teaches the intensity profiles are obtained from individual polymers in flow [0127]. Taylor et al. show in figure 16, a sample profile that is an average of multiple profiles and in figure 17, a peak profile that is an average of multiple peak profiles.

Taylor does not show an alignment reference point that is a center of molecule reference point. It is noted that the specification does not define the phrase “center of molecule reference point". The phrase is being interpreted as broadly as is reasonable.

Chan teaches a method for analyzing polymer intensity data from a sample. To accomplish the analysis, Chan obtains fluorescence intensity data from a collection of labeled nucleotide polymers (p. 18, line 25-28, p. 11, line 32-34). The polymers can be labeled at specific sites or labeled randomly (p. 18, line 31-32). The random labeling reads on the further embodiments of sequence nonspecific labels. Chan describes the use of reference points to align profiles from individual polymers (p. 63, lines 25-31). Chan teaches intensity data from labeled polymers (p. 23, line 17-22). Chan teaches intensity profiles stored as intensity vs. length profiles (p. 68, lines 7-15). Chan defines the term “polymer specific feature” as any structural feature of a polymer that relates to its sequence, reading on the center of the polymer molecule that is a structural feature related to sequence (p. 76, line 2-3). In another embodiment, Chan teaches a method where the sample contains a heterogeneous mixture of polymers, differently sized fragments and with different sequences (p. 162, lines 8-9 and p. 74, lines 23-24). In another embodiment, Chan teaches a method where profiles are intensity versus length profiles and intensity is from fluorescence (p. 9, lines 9-13 and 33-35). In another

embodiment, Chan teaches a method where the polymers are labeled with a sequence specific probe (p. 68, line 18 to p.69 line 1). In another embodiment, Chan teaches a method where the method is implemented on a computer (p. 58, lines 29-32). In another embodiment, Chan teaches a method where the polymer is a nucleic acid that is DNA, and further genomic DNA (p. 8, lines 28-29). In another embodiment, Chan teaches a method where the reference point is an internal reference point and the reference point is a sequence specific probe (p.15, line 15-16). In another embodiment, Chan teaches a method where the polymers are in flow (col. 27, line 5-9). In another embodiment, Chan teaches a method where the population profile is an average population profile (p. 63, lines 18-24). In another embodiment, Chan teaches a method where polymers in the sample are sorted according to size prior to aligning individual intensity profiles (p. 119, line 35). In another embodiment, Chan teaches a method where the peak profile is an average peak profile (p. 40, line 31). In another embodiment, Chan teaches a method where peak is selected based on intensity (p. 40, lines 24-26). In another embodiment, Chan teaches a method where the polymer is completely stretched, partially stretched, or uniformly stretched (p. 101, lines 17-19). In another embodiment, Chan teaches a method where the peak is visible in an intensity vs. length profile (figs. 2 and 9). In another embodiment, Chan teaches a method where the peak corresponds to bin counts (p. 44, lines 6-7 and lines 11-12).

Chan et al. shows a process directed to characterizing individual polymers. Chan et al. shows that the center of a signal amplitude profile or the center of mass for a molecule can be a reference point, reading on a center of molecule reference point

[0018]. Chan et al. shows that the signal amplitude profile is obtained when a labeled polymer moves relative to a detection zone [0017]. Chan et al. shows that a signal amplitude profile has a beginning, middle and end portions [0038]. The portions of the signal amplitude profile correspond to polymer specific features. Chan et al. shows that an end-labeled polymer can enter the detection zone with either the labeled or the unlabeled end as the leading edge [0083]. Thus, Chan et al. suggest that a profile of a single polymer may produce two signal amplitude profiles that are mirror images dependent on which end of the polymer enters the detection zone as the leading edge.

Sun shows a method of symmetry detection. Sun shows symmetry is prolific phenomena in the world (p. 987, col. 1). Sun shows that symmetry is good at describing shape and is a powerful concept facilitating object detection and recognition (p. 987, col. 2). Sun shows that if half of an image is the mirror image of the other half, then one-half need not be described suggesting flipping or inverting (p. 987, col. 2). Sun shows that center of mass can be used to determine the symmetry of an object (p. 993, col. 1 and figure 4).

It would have been obvious to one of skill in the art at the time of invention to modify the method of polymer analysis of Taylor et al. with the sequence specific probes of Chan because Chan shows by doing so polymers labeled with sequence specific probes have a characteristic signature that allow the polymers to be identified from mixtures of similar polymer of different sequence, an advantage when testing mixtures of polymers. One of skill in the art would have been capable of applying sequence specific probes to a method of polymer analysis and the results would have been

predictable to one of skill in the art. It would have been further obvious to one of ordinary skill in the art at the time of invention to modify the method of characterizing polymers of Taylor et al. in view of Chan with the reference point that is the center of a polymer molecule of Chan et al. and the symmetry detection of Sun because the elongated polymers described in Taylor et al., Chan, and Chan et al. are symmetrical objects that have at least one axis of symmetry that lies at midpoint of the length and Sun shows that symmetry is good at describing shape and is a powerful concept facilitating object detection and recognition.

Response to Arguments

Applicant's arguments filed 26 May 2009 have been fully considered but they are not persuasive. Applicant argues Taylor does not show obtaining individual intensity profiles from individual labeled polymers. The argument is not persuasive. Taylor et al shows that profiles are obtained from polymers [0030]. Taylor et al. show that DNA polymers can be additionally labeled to enhance detection [0232]. Thus, each individual profile obtained is from individually labeled polymers. With respect to applicants argument that Taylor et al. fails to shows the alignment of profiles by a reference point, the argument is not persuasive. Taylor et al. shows the profiles are aligned with respect to a reference point [0187]. With respect to applicant's argument regarding the separation polymers by size and the distinction between MIPC and DMIPC, the argument is not persuasive. Taylor et al. at [0134] describes MIPC a technique that separates polymers by size. Taylor shows that when a MIPC is performed at elevated temperatures, also called DMIPC, the polymers are additionally separated by hetero-

and homo-duplexes. Thus, Taylor et al. does show separation of polymers by size. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one would have been motivated by Chan, who shows the use of labeled probes as a means for detecting specific DNA fragments, to modify the method of Taylor et al. to identify profiles indicative of mutation in particular biopolymers. With respect to applicant's argument that Chan fails to show a center of molecule reference point, the argument is not persuasive. Chan et al shows a center of molecule reference point [0018]. Applicant argues that Chan at page 15 lines 15 and 16 does not show a reference point that is internal and a sequence specific probe. Page 15, line 15-16 of Chan shows the method identifies a unit specific marker (a point of reference) that is indicative of the identity of at least one unit of the polymer. In the language of Chan, a unit of the polymer correlates to the bases that make up the sequence of the polymer. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references

themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant argues there is no motivation in Chan to orient datasets. Taylor motivates one to orient profiles showing the transformed profiles have a clear presentation that facilitates analysis [0188]. Applicant argues that the relevance of Sun et al is unclear. The argument is not persuasive. Sun provides a method of identifying symmetry in objects based on the center of mass of the object. Chan et al. shows that DNA polymers can be analyzed with respect to their center of mass. The method of Sun provides a fast and efficient method to determine if symmetry exists that is applicable to identifying symmetry in the nucleic acids of Chan et al.

Claims 1, 27, 29-36, 38, 46 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above, and further in view of Schwartz et al. (Science, Vol. 262, No. 5130, p. 110-114, 1993).

Claim 27 is directed to an embodiment in which a peak profile that resembles a population profile is a non-oriented profile.

Claim 57 is directed to a method for analyzing polymer intensity data with the limitations of claims 1 and 27, but does not require an alignment profile that is a center of molecule reference point as in claim 1.

Claim 29 is directed to a method for analyzing polymer intensity data with the limitations of claim 1 and claim 28, but does not require an alignment profile that is a center of molecule reference point as in claim 1. Claim 29 additionally inverts an oriented profile and adds the inverted oriented profile to the orient profile to generate a putative non-inverted profile that is compared to the population to determine that the peak profile is an oriented profile.

Claim 30 is directed to a method for analyzing polymer intensity data with the limitations of claim 1 and claim 28, but does not require an alignment profile that is a center of molecule reference point as in claim 1. Claim 30 additionally has the step of determining whether individual peaks in the peak profile have corresponding mirror image peaks in the population profile when the alignment reference point is a center of molecule reference point. It is noted that the step of "determining whether individual peaks in the peak profile have corresponding mirror image peaks in the population profile **when** the alignment point is a center of molecule reference point" is an optional step because the method does not require a center of molecule reference point. The claim is thus interpreted to mean that the optional determining step is only performed when the alignment point is a center of molecule reference point. In some embodiments, the presence of corresponding mirror image peaks in a putative oriented profile indicates it is an oriented profile. In an embodiment, the oriented profile is inverted and added to or combined with the oriented profile to generate a putative non-oriented profile that is compared to the population profile.

Claim 32 is directed to a method for analyzing polymer intensity data with the limitations of claim 1 and claim 28, but does not require an alignment profile that is a center of molecule reference point as in claim 1. Claim 32 additionally has the step of determining whether the oriented peak has a corresponding mirror image peaks in the population profile when the alignment reference point is a center of molecule reference point. It is noted that the step of "determining whether the oriented peak has a corresponding mirror image peak in the sample population profile **when** the alignment reference point is a center of molecule reference point." is an optional step because the method does not require a center of molecule reference point. The claim is thus interpreted to mean that the optional determining step is only performed when the alignment point is a center of molecule reference point. In some embodiments, intensity profiles are obtained that contribute to the mirror image peak and combining the intensity profiles that contribute to the mirror image peak to generate a mirror image peak profile. In some embodiments, the mirror image peak profile is compared to the population profile. In some embodiments, a step of determining if the mirror image peak profile is a mirror image of the peak profile. In some embodiments, a step of inverting and combining the mirror image peak profile with the peak profile provided the mirror image peak profile is a mirror image of the peak profile.

Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above shows a method of analyzing polymers.

Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above do not explicitly show that a peak profile that resembles a population profile is a non-oriented profile.

Schwartz et al. shows a method of optically mapping chromosomes from Saccharomyces cerevisiae. Schwartz produces a map of a chromosome by elongating the nucleic acid in a flow of molten agarose (p. 110, col. 3). The elongated nucleic acid is then optically imaged (p. 110, col. 3). From the image, two related measurements can made intensity and length (p. 111, col. 2). Schwartz et al. shows nucleic acids that have nearly symmetric maps cannot be averaged to improve resolution unless one end is identified, so that map polarity must be established through ancillary means (p. 112, col. 1). The suggestion by Schwartz et al. to establish polarity or generate an “oriented profile” and the symmetric nature of nucleic acid that prevents optimal averaging (i.e. “non-oriented profile”) read on the determining and generating oriented and non-oriented profiles.

With respect to claims 29, 30, and 32, Taylor et al., in view of Chan, in view of Chan et al., in view of Sun and Schwartz et al. is applied as it is applied to claim 1.

It would have been further obvious to one of ordinary skill in the art at the time of invention to determine that a peak profile that resembles a population profile is a non-oriented profile in the population in the method of polymer analysis of Taylor et al. in view of Chan in view of Chan et al. in view of Schwartz et al. and in view of Sun. Both Chan et al. and Schwartz et al. suggest the ability of a polymer molecule being analyzed

to be detected by either end of the polymer. Schwartz shows that nucleic acid symmetry prevents the improvement of resolution by averaging; however, asymmetric labeling eliminates the symmetry and allows the improvement of resolution by averaging. Chan et al. shows that an end-labeled polymer can enter the detection zone with either the labeled or the unlabeled end as the leading edge. Sun showed that an object’s center of gravity can be used to determine the axis of symmetry and facilitates the identification of the object. Thus, based on the teachings of Sun, Chan et al. and Schwartz et al., one of ordinary skill would have been guided to determine that a peak profile that resembles a population profile is a non-oriented profile. With respect to the limitations of claim 29 directed to inverting an oriented profile and adding the inverted oriented profile to the orient profile to generate a putative non-inverted profile that is compared to the population to determine that the peak profile is an oriented profile, it would have been obvious to one of skill in the art at the time of invention to modify the method of polymer analysis of Taylor et al. with the sequence specific probes of Chan because Chan shows by doing so the polymers labeled with sequence specific probes have a characteristic signature that allow the polymers to be identified from mixtures of similar polymer of different sequence, an advantage when testing mixtures of polymers. One of skill in the art would have been capable of applying sequence specific probes to a method of polymer analysis and the results would have been predictable to one of skill in the art. It would have been further obvious to one of ordinary skill in the art at the time of invention to modify the method of characterizing polymers of Taylor et al. in view of Chan with the reference point that is the center of a polymer molecule of Chan et al. and

the symmetry detection of Sun because the elongated polymers described in Taylor et al., Chan, and Chan et al. are symmetrical objects that have at least one axis of symmetry that lies at midpoint of the length and Sun shows that symmetry is good at describing shape and is a powerful concept facilitating object detection and recognition. It would have been further obvious one of ordinary skill in the art at the time of invention to invert a peak profile having a subset of peaks from the population and combine the inverted and peak profiles to generate a putative non-oriented profile which is compared to the population to verify that the peak profile is an oriented profile because the techniques of inversion or "reflection" as described by Sun et al., combination and comparison of spectra as described in Taylor et al., the identification of oriented vs. non-oriented peak profile was recognized as part of the ordinary capabilities of one skilled in the art. One of ordinary skill in the art would have been capable of applying these known techniques to the method that was ready for improvement and the results would have been predictable to one of ordinary skill in the art.

Response to Arguments

Applicant's arguments filed 26 May 2009 have been fully considered but they are not persuasive. Applicant argues that Schwartz fail to cure the deficiencies of Taylor et al. in view of Chan, in view of Chan et al. and in view Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56. The argument is not persuasive for the reasons provided above. Applicant argues Schwartz teaches away. The argument is not persuasive. Schwartz at p. 113 is merely pointing out that symmetrical fragment (or nearly symmetrical) fragments of DNA should be modified to eliminate the

symmetry. With respect to applicant's argument that the suggestion of Schwartz et al. to establish polarity is unsupported is not persuasive. Schwartz shows the establishment of polarity (p. 110 and 113). With respect to applicant's argument that nucleic acids are not symmetrical, the argument is not persuasive. Applicant's example of the elution times of Taylor as an example fails to show how the DNA fragments do not have at least one axis of symmetry that lies at the midpoint of their length. Schwartz et al. shows nucleic acid fragments have an axis of symmetry that lies at the midpoint of their length (p. 113). With respect to applicant's argument that the techniques of inversion (reflection), combining, and comparison of spectra were not part of the capabilities of one of ordinary skill in the art, the argument is not persuasive. The techniques of inversion or "reflection" are described by Sun et al., combination and comparison of spectra as described in Taylor et al. Additionally, Sun et al uses the reflection to orient objects (figure 2).

Claims 1, 28, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above, and further in view of Dousseau et al. (Applied Spectroscopy, Vol. 43, No. 3, p. 538-542, 1989).

Claim 39 is directed to subtracting the peak profile from the population profile.

Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above shows a method analyzing polymers.

Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above do not explicitly show the subtraction of spectra.

Dousseau et al. shows a process for subtracting spectra in the analysis of polymers by FT-IR. Dousseau et al. shows that the profile that results from water in a polymer FT-IR experiment can be subtracted from the sample profile to reveal the contributions of the polymer in the FT-IR profile (figure 2 and p. 540, col. 1). Dousseau et al. the profile subtraction process has good reproducibility (p. 41, col. 1). Dousseau et al. shows that the process has the advantage of eliminating user bias encountered with interactive methods and takes into account baseline variations due to instrument drift (p. 542, col. 2).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method of polymer analysis of Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56 above with the profile subtraction of Dousseau et al. because Dousseau et al. shows the process has the advantage of eliminating user bias encountered with interactive methods and takes into account baseline variations due to instrument drift.

Response to Arguments

Applicant's arguments filed 26 July 2009 have been fully considered but they are not persuasive. Applicant argues Dousseau et al. fail to cure the deficiencies of Taylor et al., in view of Chan, in view of Chan et al. and in view of Sun as applied to claims 1-4, 6, 8-12, 16-18, 21, 23-25, 26, 28, 44-45, 50-53, and 55-56. The argument is not persuasive for the reasons provided above. In response to applicant's argument that Dousseau et al is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the claims are directed to removing the influence of a particular profile has on an average or population profile. Dousseau et al shows a process by which the influence of the profile due to water in a spectroscopy experiment is removed from the profile of the sample. Dousseau et al shows the process has the advantage of eliminating user bias encountered with interactive methods and takes into account baseline variations due to instrument drift. Similar to Dousseau et al., Taylor applies a transform that produces a baseline correction to account for baseline variation due to instrument drift [0157]. Taylor shows that performing the transform allows one to identify groups in the transformed data that could not be identified in the raw data.

Claims 40-41, and 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of

Schwartz et al. as applied to claim 30-36, 38, and 46 above, and further in view of Dousseau et al.

Claim 54 is directed to subtracting profiles.

Claim 40 is directed to subtracting the mirror image peak profile from the sample population profile.

Claim 41 is directed to subtracting the peak profile and mirror image profile from the population.

Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 30-36, 38, and 46 above shows a method analyzing polymers.

Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 30-36, 38, and 46 above do not explicitly show the subtraction of spectra.

Dousseau et al. shows a process for subtracting spectra in the analysis of polymers by FT-IR. Dousseau et al. shows that the profile that results from water in a polymer FT-IR experiment can be subtracted from the sample profile to reveal the contributions of the polymer in the FT-IR profile (figure 2 and p. 540, col. 1). Dousseau et al. the profile subtraction process has good reproducibility (p. 41, col. 1). Dousseau et al. shows that the process has the advantage of eliminating user bias encountered with interactive methods and takes into account baseline variations due to instrument drift (p. 542, col. 2).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method of polymer analysis of Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 30-36, 38, and 46 above with the profile subtraction of Dousseau et al. because Dousseau shows the process has the advantage of eliminating user bias encountered with interactive methods and takes into account baseline variations due to instrument drift.

Response to Arguments

Applicant's arguments filed 26 July 2009 have been fully considered but they are not persuasive. Applicant argues Dousseau et al. fail to cure the deficiencies of Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 30-36, 38, and 46. The argument is not persuasive for the reasons provided above. In response to applicant's argument that Dousseau et al is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the claims are directed to removing the influence of a particular profile has on an average or population profile. Dousseau et al shows a process by which the influence of the profile due to water in a spectroscopy experiment is removed from the profile of the sample. Dousseau et al shows the process has the advantage of eliminating user bias encountered with interactive methods and takes into account baseline variations due to instrument drift. Similar to Dousseau et al., Taylor

applies a transform that produces a baseline correction to account for baseline variation due to instrument drift [0157]. Taylor shows that performing the transform allows one to identify groups in the transformed data that could not be identified in the raw data.

Claims 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 32-36 and 38 above, and further in view of Dousseau et al. as applied to claims 40-41 above, and further in view of Sievert (EP0437829).

Claim 42 is directed to the determination of additional peaks remaining after spectral subtraction.

Claim 43 is directed to presence of additional peaks being indicative of a mixture of polymers in the sample.

Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 32-36 and 38 above, and further in view of Dousseau et al. as applied to claims 40-41 above shows a method of polymer analysis in which spectra are subtracted.

Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 32-36 and 38 above, and further in view of Dousseau et al. as applied to claims 40-41 above do not show the determination of additional peaks that are indicative of a mixture of polymers.

Sievert shows the subtraction of spectra to reveal additional peaks that are indicative of a mixture of polymers (p. 8). Sievert shows profiles are characteristics of

the compounds that they represent and profiles of different compounds can be compared to distinguish between them (p. 2).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the polymer analysis method of Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 32-36 and 38 above, and further in view of Dousseau et al. as applied to claims 40-41 above with the determination of additional peaks that are indicative of a mixture of polymers of Sievert because all the claimed elements were known, in the prior art, and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention.

Response to Arguments

Applicant's arguments filed 26 July 2009 have been fully considered but they are not persuasive. Applicant argues that Sievert fails to cure the deficiencies of Taylor et al., in view of Chan, in view of Chan et al., in view of Sun, and in view of Schwartz et al. as applied to claim 32-36 and 38 above, and further in view of Dousseau et al. as applied to claims 40-41. The argument is not persuasive for the reasons above. Applicant argues that the prior art fails to show the subtraction of profiles. The argument is not persuasive because Sievert shows subtraction of profiles (p. 8, line 25-27). The profiles subtracted by Sievert are in the profile itself (p. 8, line 22-24). In response to applicant's argument that there is no suggestion to combine the references, the

examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Sievert provides motivation by showing clear advantages in reducing the potential for incorrect peak matching: (1) the entire evaluation procedure can be automated to obtain a final sample score without the need for operator intervention; and (2) the scoring procedure is completely digital and therefore not subject to observer bias.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARLHEINZ R. SKOWRONEK whose telephone number is (571)272-9047. The examiner can normally be reached on 8:00am-5:00pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. R. S./
Examiner, Art Unit 1631

10 September 2009

/Marjorie Moran/
Supervisory Patent Examiner, Art Unit 1631